

WE CLAIM:

1. A lubrication system suitable for providing lubricant from a lubricant supply line to a bearing support operating in an engine casing, said lubrication system comprising
 - an inlet conduit having an inboard end attached to the bearing support and an outboard end for receiving the lubricant;
 - a lubricant inlet assembly attached to said inlet conduit outboard end, said lubricant inlet assembly including
 - an inlet cap having a receptacle and an inlet cap body, said receptacle configured to mate with the lubricant supply line, said inlet cap body having an outer cap enclosing an inner cap;
 - an inlet conduit termination fitting having an outboard fitting section with a circumferential groove and disposed inside said inner cap, and an inboard fitting section attached to said inlet conduit outboard end; and
 - an inlet o-ring disposed in said circumferential groove.
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2. The lubrication system of Claim 1 wherein said outer cap comprises a convoluted wall.
3. The lubrication system of Claim 1 wherein said inlet cap further comprises a cap base for attachment to the engine casing.
4. The lubrication system of Claim 3 wherein said cap base comprises a circular recess.
5. The lubrication system of Claim 4 wherein said cap base comprises a circular ridge enclosing said circular recess.

6. The lubrication system of Claim 5 wherein said lubricant inlet assembly further comprises a gasket disposed against said cap base, said gasket ridge enclosing said circular ridge.

7. The lubrication system of Claim 6 wherein said gasket comprises a low conductivity insulator.

8. The lubrication system of Claim 1 wherein said lubricant inlet assembly further comprises a cap heat shield enclosing said inlet cap.

9. The lubrication system of Claim 8 wherein said cap heat shield comprises a cylindrical shield and at least one mounting bracket.

10. The lubrication system of Claim 1 wherein said lubricant inlet assembly further comprises a conduit heat shield.

11. The lubrication system of Claim 10 wherein said conduit heat shield comprises a flared section.

12. The lubrication system of Claim 10 wherein said conduit heat shield comprises a circumferential discontinuity.

13. The lubrication system of Claim 1 further comprising:
a scavenge port, and
a scavenge conduit having an inboard end attached to the bearing support and an outboard end attached to said scavenge port.

14. The lubrication system of Claim 13 wherein said scavenge port comprises:

an elbow cap,
a conduit termination fitting disposed inside said elbow cap, and
5 an o-ring disposed between said elbow cap and said conduit
termination fitting.

15. The lubrication system of Claim 14 wherein said elbow cap
comprises a cylindrical elbow.

16. The lubrication system of Claim 14 wherein said conduit
termination fitting comprises a flared outboard fitting section.

17. The lubrication system of Claim 1 further comprising:
a buffer air port, and
a buffer air conduit having an inboard end attached to the bearing
support and an outboard end attached to said buffer air port.

18. The lubrication system of Claim 17 wherein said buffer air port
comprises a pair of buffer air piston rings.

19. A lubricant inlet assembly suitable for attachment to an engine
casing at an outboard end of an inlet conduit used for providing lubricant from a
lubricant supply line to a bearing support attached to an inboard end of the inlet
conduit, said lubrication system comprising
5 an inlet cap having a receptacle configured to mate with the
lubricant supply line, a cap body having an outer cap enclosing an inner cap,
and a cap base, said outer cap having a convoluted wall;
an inlet conduit termination fitting disposed inside said inner cap
and including a first section with a circumferential groove and a second section
10 attached to the outboard end of the inlet conduit; and

an inlet o-ring disposed in said circumferential groove.

20. The lubricant inlet assembly of Claim 19 further comprising a low-conductivity insulator disposed between said cap base and the engine casing.

21. The lubricant inlet assembly of Claim 19 further comprising a cap heat shield enclosing said inlet cap.

22. The lubricant inlet assembly of Claim 19 further comprising a conduit heat shield enclosing the inlet conduit.

23. A lubricant inlet assembly suitable for attachment to an engine casing at an outboard end of an inlet conduit used for providing lubricant from a lubricant supply line to a bearing support attached to an inboard end of the inlet conduit, said lubrication inlet assembly comprising

- 5 an inlet cap having a receptacle configured to mate with the lubricant supply line, and a cap base attached to the engine casing;
 a cap heat shield enclosing said inlet cap; and
 an inlet conduit termination fitting attached to the outboard end of the inlet conduit and disposed inside said inlet cap.

24. The lubricant inlet assembly of Claim 23 further comprising a conduit heat shield enclosing the inlet conduit.

25. The lubricant inlet assembly of Claim 23 further comprising a low-conductivity insulator disposed between said cap base and the engine casing.

26. A scavenge port suitable for attachment to an engine casing at an outboard end of a scavenge inlet conduit used for removing lubricant from a bearing support attached to an inboard end of the scavenge conduit, said scavenge port comprising

5 a cap having a receptacle configured to mate with a lubricant removal line, and a cap base attached to the engine casing;

a conduit termination fitting attached to the outboard end of the scavenge conduit and disposed inside said cap; and

10 a conduit heat shield enclosing the scavenge conduit so as to block thermal radiation from the engine casing.

27. The scavenge port of Claim 26 further comprising a cap heat shield enclosing said cap.

28. The scavenge port of Claim 26 further comprising a low-conductivity insulator disposed between said cap base and the engine casing.

29. A vent assembly suitable for attachment to an engine casing at an outboard end of a vent inlet conduit used for venting a bearing support attached to an inboard end of the vent conduit, said vent assembly comprising

5 a cap having a receptacle configured to mate with a vent line, and a cap base attached to the engine casing, said cap base having a circular ridge enclosing a circular recess;

a low-conductivity insulator disposed between said cap base and the engine casing, said low-conductivity insulator enclosing said circular ridge; and

10 a conduit termination fitting attached to the outboard end of the vent conduit and disposed inside said cap.

30. The scavenge port of Claim 29 further comprising a cap heat shield enclosing said cap.

31. The scavenge port of Claim 29 further comprising a conduit heat shield enclosing said vent conduit.

32. A lubrication system suitable for a bearing support operating in an engine casing, said lubrication system comprising

an inlet conduit having an inboard end attached to the bearing support and an outboard end for receiving the lubricant;

5 a lubricant inlet assembly attached to said inlet conduit outboard end, said lubricant inlet assembly including

an inlet cap having a receptacle configured to mate with a lubricant supply line, a cap body with an outer cap enclosing an inner cap, and an inlet cap base;

10 an inlet conduit termination fitting with a circumferential groove and an o-ring disposed in said groove, said inlet conduit termination fitting attached to said inlet conduit outboard end;

a scavenge conduit having an inboard end attached to the bearing support and an outboard end for access in removing the lubricant;

15 a scavenge port attached to said scavenge conduit outboard end, said scavenge port including

an elbow cap having a receptacle configured to mate with a lubricant removal line, a cap body having an outer cap enclosing an inner cap, and a cap base;

20 a conduit termination fitting with a circumferential groove and an o-ring disposed in said groove, said scavenge port conduit termination fitting attached to said scavenge conduit outboard end;

a buffer air conduit having an inboard end attached to the

bearing support and an outboard end;
25 a buffer air port attached to said buffer air conduit outboard
end, said buffer air port including
 a buffer air cap having a cap body, a buffer air elbow, and
a buffer air cap base; and
 a buffer air conduit termination fitting with two
30 circumferential grooves and two piston rings disposed in respective said
grooves, said buffer air conduit termination fitting attached to said buffer air
conduit outboard end.

33. The lubrication system of Claim 32 further comprising at least one
cap heat shield enclosing at least one of said inlet cap, said elbow cap, and
said buffer air cap.

34. The lubrication system of Claim 32 further comprising at least one
conduit heat shield enclosing at least one of said inlet conduit, said scavenge
conduit, and said buffer air conduit.

35. The lubrication system of Claim 32 further comprising at least one
low conductivity insulator disposed between the engine casing and at least one
of said inlet cap base, said cap base, and said buffer air cap base.

36. A lubrication system suitable for retrofitting a shaft-driven engine
having a bearing support mounted to an engine casing, the engine further
having inboard ends of an inlet conduit, at least one scavenge conduit, a vent
conduit, and a buffer air conduit attached to the bearing support, said
5 lubrication system comprising
 a lubricant inlet assembly including
 an inlet cap having an inlet receptacle configured to mate

with a lubricant supply line, an inlet cap body with an outer inlet cap enclosing an inner inlet cap, and an inlet cap base for attachment to the engine casing,
10 said outer inlet cap having a convoluted wall;

an inlet conduit termination fitting with a circumferential groove and an inlet o-ring disposed in said groove, said inlet conduit termination fitting attached to an outboard end of the inlet conduit;

a cap heat shield enclosing said inlet cap, a conduit heat
15 shield attached to the inlet conduit, and a low conductivity insulator disposed between said inlet cap base and the engine casing;

a vent assembly including

an elbow cap having an outer cap enclosing an inner cap,
and a cap base for attachment to the engine casing, said outer cap having a
20 convoluted wall;

a conduit termination fitting with a circumferential groove and an o-ring disposed in said groove, said vent assembly conduit termination fitting attached to an outboard end of the vent conduit;

a cap heat shield enclosing said vent assembly elbow cap,
25 a conduit heat shield attached to the vent conduit, and a low conductivity insulator disposed between said vent assembly cap base and the engine casing;

a first scavenge port including

an elbow cap configured to mate with a first lubricant
30 removal line, a cap body having an outer cap enclosing an inner cap, and a cap base for attachment to the engine casing, said first scavenge port outer cap having a convoluted wall;

a conduit termination fitting with a circumferential groove and an o-ring disposed in said groove, said first scavenge port conduit
35 termination fitting attached to an outboard end of the first scavenge conduit;

a cap heat shield enclosing said first scavenge port elbow

cap, a conduit heat shield attached to the first scavenge conduit, and a low conductivity insulator disposed between said first scavenge port cap base and the engine casing;

- 40 a buffer air port including
- a buffer air cap having a buffer air cap body, a buffer air elbow and a buffer air cap base for attachment to the engine casing; and
- a buffer air conduit termination fitting with two circumferential buffer air grooves and two buffer air piston rings disposed in
- 45 respective said buffer air grooves, said buffer air conduit termination fitting attached to an outboard end of the buffer air conduit; and
- a cap heat shield enclosing said buffer air cap, a conduit heat shield attached to the buffer air conduit, and a low conductivity insulator disposed between said buffer cap air base and the engine casing.

37. The lubrication system of Claim 36 further comprising
- a second scavenge port including
- an elbow cap configured to mate with a second lubricant removal line, a cap body having an outer cap enclosing an inner cap and a cap
- 5 base for attachment to the engine casing, said second scavenge port outer cap having a convoluted wall;
- a conduit termination fitting with a circumferential groove and an o-ring disposed in said groove, said second scavenge port conduit termination fitting attached to an outboard end of a second scavenge conduit;
- 10 and
- a cap heat shield enclosing said second scavenge port elbow cap, a conduit heat shield attached to the second scavenge port conduit, and a low-conductivity insulator disposed between said second scavenge port cap base and the engine casing.

38. The lubrication system of Claim 36 wherein said cap heat shield comprises a thin-walled cylindrical shield attached to an L-shaped mounting bracket.

39. The lubrication system of Claim 36 wherein said cap heat shield comprises a nickel-based alloy.

40. A method of providing lubrication from a lubricant supply line to a bearing support operating in a engine casing, the engine casing having inboard ends of an inlet conduit, a scavenge conduit, a vent conduit, and a buffer air conduit attached to the bearing support, said method comprising the steps of

5 attaching an outboard end of the inlet conduit to a lubricant inlet assembly, said lubricant inlet assembly including

an inlet conduit termination fitting having an inlet o-ring disposed in a circumferential groove, said inlet conduit termination fitting attached to said inlet conduit outboard end;

10 an inlet cap having an inlet receptacle configured to mate with a lubricant supply line, an inlet cap body with an outer inlet cap enclosing an inner inlet cap, and an inlet cap base for attachment to the engine casing, said outer inlet cap having a convoluted wall, said inner inlet cap enclosing said inlet o-ring; and

15 providing lubricant to the bearing support via said inlet receptacle and the lubricant supply line.

41. The method of Claim 40 further comprising the steps of
providing a cap heat shield enclosing said inlet cap so as to block thermal radiation from the engine casing; and

5 providing a conduit heat shield attached to the inlet conduit so as to block radiation from the engine casing.

42. The method of Claim 40 further comprising the steps of
attaching an outboard end of the scavenge conduit to a scavenge
port, said scavenge port including
a conduit termination fitting having an o-ring disposed in a
5 circumferential groove, said scavenge port conduit termination fitting attached
to said scavenge conduit outboard end;
an elbow cap having a receptacle configured to mate with a
lubricant removal line, a cap body with an outer cap enclosing an inner cap, and
a cap base for attachment to the engine casing, said scavenge port outer cap
10 having a convoluted wall, said scavenge port inner cap enclosing said
scavenge port o-ring; and
removing lubricant from the bearing support via said scavenge
port receptacle and the lubricant removal line.

43. The method of Claim 42 further comprising the steps of
providing a cap heat shield enclosing said elbow cap so as to
block radiation from the engine casing; and
providing a conduit heat shield attached to the scavenge conduit
5 so as to block radiation from the engine casing.

44. The method of Claim 40 further comprising the steps of
attaching an outboard end of the vent conduit to a vent assembly,
said vent assembly including
a conduit termination fitting having an o-ring disposed in a
5 circumferential groove, said vent conduit termination fitting attached to said vent
conduit outboard end;
a cap having a receptacle configured to mate with a vent
line, a cap body with an outer cap enclosing an inner cap, and a cap base for

attachment to the engine casing, said vent outer cap having a convoluted wall,
10 said vent inner cap enclosing said vent o-ring; and
venting the bearing support via said vent assembly
receptacle and the vent line.

45. The method of Claim 40 further comprising the steps of
attaching an outboard end of the buffer air conduit to a buffer air
port, said buffer air port including
a buffer air conduit termination fitting having a pair of buffer
5 air piston rings, each said buffer air piston ring disposed in a respective
circumferential buffer air groove, said buffer air conduit termination fitting
attached to said buffer air conduit outboard end;
a buffer air cap having a buffer air receptacle configured to
mate with a buffer air line, and a buffer air cap base for attachment to the
10 engine casing, said buffer air cap enclosing said buffer air piston rings; and
buffering the bearing support via said buffer air line.